Figure 156. Predicted failure loads vs. pile length for I-40 case

In summary, twenty axial and ten lateral load tests are analyzed and simulated using T-z, Q-z, or P-y curve approaches. By applying a reliability analysis to the results, resistance factors are developed and proposed for use by NCDOT.

The Limestone (McVay) model, used by NCDOT in practice, is employed to simulate the response measured from axial load tests. For some cases with high RQD and unconfined compressive strength of rock mass layer, Horvath and Kenney, and Intermediate Geo-Material models are considered for the cases. The geologic model and the Stiff Clay model are considered for the simulation of lateral load-deflection response

Analyses results yielded a resistance factor of 0.38 for the axial loading condition. If sufficient geotechnical information is available, and IGM model is used for the analysis, the resistance factor can be increased to 0.57, a value close to that recommended using R&W model in NCHRP 507. For the determination of a failure load from axial load-settlement relationship, Davisson's method is recommended, because the capacity prediction by this method resulted in relatively less scatter as well as consistent underestimation of the measured shaft capacity. Values obtained using Chin's method tended to overestimate the shaft capacity.